

REMARKS

Claims 20-22 and 24-41 are pending in the application. In view of the remarks that follow, Applicants respectfully request reconsideration.

Power of Attorney

A new Power of Attorney for the present application was filed in the PTO on January 13, 2005. The Power of Attorney also updated the correspondence address for this application. However, eight months later, the Office Action of August 11, 2005 was mailed to the obsolete correspondence address, rather than to the current correspondence address. Applicants therefore respectfully request that the Examiner take a moment to ensure that the new correspondence address and the new Power of Attorney have been properly entered into the PTO computer system, so that future PTO correspondence will be mailed to the correct address. As a courtesy, Applicants are enclosing a copy of the previously-filed new power, and a copy of a return post card on which the PTO acknowledged receipt of the new power.

Allowed Claims

Noted with appreciation is the indication in the Office Action that Claims 28-41 have been allowed.

Independent Claim 20

The subject matter of Claim 20 was previously indicated to be allowable, but the current Office Action presents a rejection of Claim 20. In particular, Claim 20 stands rejected under 35 U.S.C. §103 as obvious in view of a proposed combination of teachings from Yu U.S. Patent No. 6,784,101, Rim U.S. Patent No. 6,603,156 and Ward U.S. Application Publication No. 2005/0132952. This rejection is respectfully traversed, for the following reasons. The PTO specifies in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

Applicants respectfully submit that Yu, Rim and Ward fail to establish a *prima facie* case of obviousness under §103 with respect to Claim 20. In this regard, MPEP §2142 specifies that:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

Thus, all three of these requirements must be met in order to establish a *prima facie* case of obviousness under §103. In regard to the rejection of Claim 20; it is respectfully submitted that two of these three requirements have not been met. In particular, there has not been a proper showing of motivation to combine, or a proper showing that there would be a reasonable expectation of success. These two requirements are each discussed below.

THERE IS NO MOTIVATION TO MAKE THE PROPOSED COMBINATION

Independent Claim 20 recites a device that includes:

a structure having a strained substrate formed thereover, the strained substrate comprising at least an uppermost strained-Si epi layer having a dislocation density of strained-Si epi of less than about $1\text{E}6/\text{cm}^2$;

at least one dielectric gate oxide portion over the strained substrate, the at least one dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and

a device over each of the at least one dielectric gate oxide portion to complete the at least one high-k device.

In the Office Action, the Examiner indicates that Yu discloses a device with a strained substrate, but admits that Yu does not teach that this strained substrate could be an epi-silicon material, much less an epi-silicon material with the specific dislocation density that is expressly recited in Claim 20. The Examiner then goes on to assert that Rim discloses an epi-silicon material, and that Ward discloses an epi-silicon material with the relevant dislocation density. However, Ward is basically limited to disclosing the epi-silicon material by itself, rather than a particular application for such a material, much less an application comparable to the specific device disclosed in Yu. Turning to Rim, Rim discloses an epi-silicon layer in combination with a couple of other layers, but Rim does not disclose a device that is even remotely similar to the device disclosed in Yu. Thus, in regard to the present invention, Rim and Ward each basically disclose just an epi-silicon material, and nothing else of interest. But Applicants do not claim that their invention is just an epi-silicon material by itself. Instead, Applicants' Claim 20 is directed to a specific device with a combination of elements in which an epi-silicon material is just one of the elements. And there is nothing in either Rim or Ward that teaches or suggests that

the epi-silicon materials disclosed therein could be used in a device of the specific type disclosed in Yu.

The present Office Action essentially asserts that it would be obvious to modify Yu by replacing Yu's strained layer 2 with a layer made from an epi-silicon material like that disclosed in Rim or Ward. But as discussed above, it is a PTO requirement that the Examiner establish proper motivation for making this proposed modification to Yu. In this regard, MPEP §2142 provides that:

To reach a proper determination under §103, the examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. . . . Knowledge of applicant's disclosure must be put aside in reaching this determination, . . . impermissible hindsight must be avoided, and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

In addition, the MPEP provides at § 2143.01 that:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. . . . Although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so". (Emphasis in original).

In the present situation, the only motivation proposed in the present Office Action is that:

It would have been obvious to one . . . having ordinary skill in the art at the time the invention was made to include the required epi-silicon layer . . . [and] the required epi layer dislocation density . . . in Yu et al. as taught by Rim and Ward et al. respectively, in order to have a semiconductor device with increased performance.

But as a practical matter, and as noted above, Rim and Ward each basically disclose just an epi-silicon material, and nothing else of any significance to the present invention, Neither Rim nor Ward discloses a device that is even remotely similar in structure to the device disclosed in Yu. Thus, there is nothing in either Rim or Ward that would tend to suggest to a person skilled in the art that the epi-silicon materials disclosed in Rim and Ward could be successfully used in the type of device disclosed in Yu.

The statement about motivation in the Office Action concludes by asserting that a person skilled in the art would make the proposed combination "in order to have a semiconductor device with increased performance". But exactly what type of "increased performance" would this be? Faster operation? Reduced power consumption? Longer operational lifetime? The Office Action does not say. And contrary to the assertions in the Office Action, there is nothing in either Rim or Ward about a device of the type disclosed in Yu. Thus neither Rim nor Ward could possibly teach that increased performance would necessarily result from using an epi-silicon material in this specific type of device. Moreover, Yu states that his invention is a "high performance" semiconductor device (e.g. lines 24-27 in column 3). Therefore, since Yu teaches that his device is already a "high performance" device, why would a person skilled in the art believe that the performance of such a high performance device could be further increased? Applicants respectfully submit that Rim and Ward provide no motivation at all to try to increase the performance of the type of device disclosed in Yu, and that the Office Action thus does not

properly establish any motivation for making the proposed modification to Yu, much less explain how the prior art would serve as the basis for this motivation. As a practical matter, the approach to motivation in the Office Action essentially boils down to an assertion that the proposed modification to Yu would have been well within the ordinary skill of the art. Stated differently, the Office Action is basically relying on the level of skill in the art to provide the suggestion to modify Yu. However, this approach is directly prohibited by the provisions of MPEP §2143.01, which state that:

FACT THAT THE CLAIMED INVENTION IS WITHIN THE
CAPABILITIES OF ONE OF ORDINARY SKILL IN THE ART
IS NOT SUFFICIENT BY ITSELF TO ESTABLISH *PRIMA*
FACIE OBVIOUSNESS

A statement that modifications of the prior art to meet the claimed invention would have been " 'well within the ordinary skill of the art at the time the claimed invention was made' " because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. [Case citations omitted] . . . (The level of skill in the art cannot be relied upon to provide the suggestion to combine references).

Thus, the approach to motivation in the Office Action is an approach that is directly prohibited by the provisions of MPEP §2143.01. The present §103 rejection of Claim 20 is therefore incomplete, because it fails to properly demonstrate the motivation that is required by the MPEP. In effect, the §103 rejection is based on hindsight of the present invention, rather than on

motivation properly derived from what was known prior to the present invention. Accordingly, for this independent reason alone, it is respectfully submitted that Claim 20 is not rendered obvious under §103 by Yu, even when considered in light of Rim and Ward, and notice to that effect is respectfully requested.

THERE IS NO REASONABLE EXPECTATION OF SUCCESS

As discussed above, MPEP §2142 specifies that "there must be a reasonable expectation of success. . . . and the reasonable expectation of success must . . . be found in the prior art, and not based on applicant's disclosure". In the present situation, as explained above, Rim and Ward each disclose an epi-silicon material, but nothing else of relevance to the subject matter of Claim 20. In particular, neither Rim nor Ward discloses a device that is even remotely similar to the type of device that is disclosed in Yu. Consequently, neither Rim nor Ward contains anything that would tend to suggest that taking an epi-silicon material with a particular dislocation density and substituting it for a layer in Yu's device would yield a modified device that would not only operate, but would also provide performance superior to that of Yu's device. In other words, there is nothing in either Rim or Ward that would lead a person of ordinary skill in the art to believe that there would be any reasonable expectation of success. Apparently, the Examiner has relied on the teachings of Applicant's disclosure for a belief that there would be a reasonable expectation of success. But as noted above, MPEP §2142 expressly prohibits relying on Applicant's disclosure in regard to expectation of success. Therefore, since the Office Action fails to even discuss the criteria of a reasonable expectation of success, much less explain why Rim or Ward would provide such an expectation, it is respectfully submitted that the Office Action fails to establish a prima facie case of obviousness under §103 with respect to Claim 20.

In view of the various different reasons discussed above, it is respectfully submitted that the Office Action fails to satisfy two of the three criteria required to establish a prima facie case of obviousness. Accordingly, since the Office Action has not established a prima facie case of

obviousness, Claim 20 is not rendered obvious under §103 by Yu, Rim and Ward. Claim 20 is therefore believed to be allowable, and notice to that effect is respectfully requested.

Independent Claim 25

The subject matter of Claim 25 was previously indicated to be allowable, but the current Office Action presents a rejection of Claim 25. In particular, Claim 25 stands rejected under 35 U.S.C. §103 as obvious in view of a proposed combination of teachings from Yu U.S. Patent No. 6,784,101, Rim U.S. Patent No. 6,603,156 and Ward U.S. Application Publication No. 2005/0132952. This rejection is respectfully traversed, for the following reasons. As discussed earlier, the PTO specifies in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

Applicants respectfully submit that Yu, Rim and Ward fail to establish a *prima facie* case of obviousness under §103 with respect to Claim 25. In this regard, and as discussed above, MPEP §2142 specifies that:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim

limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

Thus, all three of these requirements must be met in order to establish a prima facie case of obviousness under §103. In regard to the rejection of Claim 25, it is respectfully submitted that two of these three requirements have not been met. In particular, there has not been a proper showing of motivation to combine, or a proper showing that there would be a reasonable expectation of success. These two requirements are each discussed below.

THERE IS NO MOTIVATION TO MAKE THE PROPOSED COMBINATION

Independent Claim 25 recites a device that includes:

a structure having a strained substrate formed thereover, the strained substrate comprising only an uppermost strained-Si epi layer having a thickness of from about 100 to 500Å;

at least one dielectric gate oxide portion over the strained substrate, the at least one dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and

a device over each of the at least one dielectric gate oxide portion to complete the at least one high-k device.

In the Office Action, the Examiner indicates that Yu discloses a device with a strained substrate, but admits that Yu does not teach that this strained substrate could be an epi-silicon material, much less an epi-silicon material with the specific thickness that is expressly recited in Claim 25. The Examiner then goes on to assert that Rim discloses an epi-silicon material, and that Ward discloses an epi-silicon material with the relevant thickness. However, as discussed above, Ward

is basically limited to disclosing the epi-silicon material by itself, rather than a particular application for such a material, much less an application comparable to the specific device disclosed in Yu. And Rim discloses an epi-silicon layer in combination with a couple of other layers, but Rim does not disclose a device that is even remotely similar to the device disclosed in Yu. Thus, in regard to the present invention, Rim and Ward each basically disclose just an epi-silicon material, and nothing else of interest. But Applicants do not claim that their invention is just an epi-silicon material by itself. Instead, Applicants' Claim 25 is directed to a specific device with a combination of elements in which an epi-silicon material is just one of the elements. And there is nothing in either Rim or Ward that teaches or suggests that the epi-silicon materials disclosed therein could be used in a device of the specific type disclosed in Yu.

The present Office Action essentially asserts that it would be obvious to modify Yu by replacing Yu's strained layer 2 with a layer made from an epi-silicon material like that disclosed in Rim or Ward. But as discussed above, it is a PTO requirement that the Examiner establish proper motivation for making this proposed modification to Yu. In this regard, MPEP §2142 provides that:

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In the present situation, the only motivation proposed in the present Office Action is that:

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But as a practical matter, and as noted above, Rim and Ward each basically disclose just an epi-silicon material, and nothing else of any significance to the present invention, Neither Rim nor Ward discloses a device that is even remotely similar in structure to the device disclosed in Yu. Thus, there is nothing in either Rim or Ward that would tend to suggest to a person skilled in the art that the epi-silicon materials disclosed in Rim and Ward could be successfully used in the type of device disclosed in Yu.

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Action does not say. And contrary to the assertions in the Office Action, there is nothing in either Rim or Ward about a device of the type disclosed in Yu. Thus neither Rim nor Ward could possibly teach that increased performance would necessarily result from using an epi-silicon material in this specific type of device. Moreover, Yu states that his invention is a "high performance" semiconductor device (e.g. lines 24-27 in column 3). Therefore, since Yu teaches that his device is already a "high performance" device, why would a person skilled in the art believe that the performance of such a high performance device could be further increased? Applicants respectfully submit that Rim and Ward provide no motivation at all to try to increase the performance of the type of device disclosed in Yu, and that the Office Action thus does not properly establish any motivation for making the proposed modification to Yu, much less explain how the prior art would serve as the basis for this motivation. As a practical matter, the approach to motivation in the Office Action essentially boils down to an assertion that the proposed modification to Yu would have been well within the ordinary skill of the art. Stated differently, the Office Action is basically relying on the level of skill in the art to provide the suggestion to modify Yu. However, this approach is directly prohibited by the provisions of MPEP §2143.01, which state that:

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As discussed above, MPEP §2142 specifies that "there must be a reasonable expectation of success. . . . and the reasonable expectation of success must . . . be found in the prior art, and not based on applicant's disclosure". In the present situation, as explained above, Rim and Ward each disclose an epi-silicon material, but nothing else of relevance to the subject matter of Claim 25. In particular, neither Rim nor Ward discloses a device that is even remotely similar to the type of device that is disclosed in Yu. Consequently, neither Rim nor Ward contains anything that would tend to suggest that taking an epi-silicon material with a particular thickness and substituting it for a layer in Yu's device would yield a modified device that would not only operate, but would also provide performance superior to that of Yu's device. In other words, there is nothing in either Rim or Ward that would lead a person of ordinary skill in the art to believe that there would be any reasonable expectation of success. Apparently, the Examiner has relied on the teachings of Applicant's disclosure for a belief that there would be a reasonable

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In view of the various different reasons discussed above, it is respectfully submitted that the Office Action fails to satisfy two of the three criteria required to establish a prima facie case of obviousness. Accordingly, since the Office Action has not established a prima facie case of obviousness, Claim 20 is not rendered obvious under §103 by Yu, Rim and Ward. Claim 20 is therefore believed to be allowable, and notice to that effect is respectfully requested.

Dependent Claims

Claims 21-22 and 24 and Claims 26-27 respectively depend from Claim 20 and Claim 25, and are also believed to be distinct from the art of record, for example for the same reasons discussed above with respect to Claims 20 and 25.

Conclusion

Based on the foregoing, it is respectfully submitted that all of the pending claims are fully allowable, and favorable reconsideration of this application is therefore respectfully requested. If the Examiner believes that examination of the present application may be advanced in any way by a telephone conference, the Examiner is invited to telephone the undersigned attorney at 972-739-8647.

Appl. No. 10/762,164
Reply to Office Action of August 11, 2005

Attorney Docket No. 2002-0246 / 24061.477
Customer No. 42717

Although Applicants believe that no fee is due in association with the filing of this Response, the Commissioner is hereby authorized to charge any additional fee required by this paper, or to credit any overpayment, to Deposit Account No. 08-1394 of Haynes and Boone LLP.

Respectfully submitted,



T. Murray Smith
Registration No. 30,222
(972) 739-8647

Date: January 4, 2006

HAYNES AND BOONE, LLP
901 Main Street, Suite 3100
Dallas, Texas 75202-3789
Telephone: (972) 739-8647
Facsimile: (214) 200-0853
File: 24061.477

Enclosure: Courtesy Copies of Previously-Filed Power of Attorney, and Return Post Card
Petition for Time Extension
Check (\$450)
Acknowledgement Post Card

R-117437.1



**DESCRIPTION
OF PAPER**

The following were received in the U.S. Patent and Trademark Office on the date stamped hereon, via

First Class Mail: 1) Transmittal; 2) Revocation/New Power of Attorney by Assignee; and 3) this return receipt postcard

RECEIVED

JAN 24 2005

HAYNES & BOONE LLP.

APPLICANT

Liang-Gi Yao, et al.

SERIAL NO.

10/762,164

ATTORNEY
DOCKET NO.

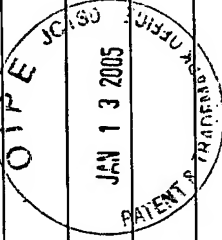
24061.477

TITLE

Noble High-K Device

DATE
FILED

January 21, 2004



RECEIVED

JAN 26 2005

HAYNES and BOONE, LLP
RICHARDSON

SENDER'S
INITIALS

DMO/dh/kam30

DATE
MAILED

1-10-2005

COPY



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:
Liang-Gi Yao, et al.
Serial No.: 10/762,164
Filed: January 21, 2004
For: Noble High-K Device

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Docket No.: 2002-0246/24061.477
Customer No. 42717
Group Art Unit: 2826
Examiner: Fazli Erdem
Conf. No.: 3763

TRANSMITTAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Enclosed for filing in the above-identified patent application.

1. Revocation/New Power of Attorney by Assignee of Entire Interest
Including Certification for Taking Action by Assignee Under 37 CFR 3.73(b); and
2. Return Receipt Postcard

Applicant believes no fee is due. However, the Director is authorized to charge any deficiency fees or credit any overpayments to Deposit Account No. 08-1394 of Haynes and Boone, LLP.

Respectfully submitted,

David M. O'Dell
Reg. No. 42,044

Date: January 7, 2005

HAYNES AND BOONE, LLP
901 Main Street, Suite 3100
Dallas, Texas 75202-3789
Telephone: 972-739-8635
Facsimile: 214-200-0853

Customer Number: 42717

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below:

Kelly A. Moreau
Name

January 10, 2005
Date

Customer No.: 42717



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

REVOCATION/NEW POWER OF ATTORNEY BY ASSIGNEE
OF ENTIRE INTEREST INCLUDING CERTIFICATION FOR
TAKING ACTION BY ASSIGNEE UNDER 37 CFR 3.73(b)

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

The below-named assignee hereby revokes all powers of attorney previously given and hereby appoints the following attorneys to prosecute the applications identified on the attached Schedule A and to transact all business in the United States Patent and Trademark Office in connection therewith:

Practitioners associated with the Customer Number: 42717

Please change the correspondence address to the address associated with the above Customer Number.

The undersigned representative of the above-identified assignee certifies that the above-identified assignee is the assignee of the entire right, title and interest in the above-identified patent application by virtue of a chain of title from the inventors of the above-identified patent application to the above-identified assignee as shown on the attached Schedule A.

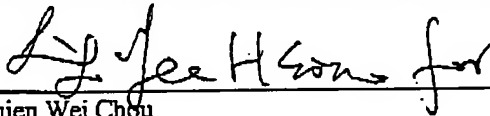
The undersigned has reviewed all the documents in the chain of title of the above-identified patent application and, to the best of the undersigned's knowledge and belief, title is in the above-identified assignee. The undersigned (whose title is supplied below) is empowered to sign this certificate on behalf of the above-identified assignee.

The present application to which this Revocation/New Power of Attorney applies to is identified on the accompanying Transmittal Letter. The undersigned hereby authorizes practitioner to redact patent applications listed on Schedule A not related to the present application.

The undersigned hereby declares that all statements made herein of the undersigned's own knowledge are true; and that all statements made on information and belief are believed to be true; and further, that these statements are made with the knowledge that willful false statements, and the like so made, are punishable by fine or imprisonment, or both, under Section 1001, Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Executed the 6th day of January, 2005.

Taiwan Semiconductor Manufacturing Company, Ltd.


Chien Wei Chou
Director, IP Division

HAYNES AND BOONE, LLP
901 Main Street, Suite 3100
Dallas, TX 75202
Phone: 972-739-8635
Fax: 214-200-0853

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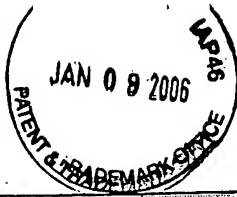
SCHEDULE A - Page 1 of 2

Docket No.	Applicant	Serial No.	Filing Date	Conf. No.	Assignment Recordation Date	Assignment Recordation Reel/Frame
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SCHEDULE A – Page 2 of 2

Customer No.: 42717

Docket No.	Applicant	Serial No.	Filing	Conf.	Assignment	Assignment
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24061.477 (2002-0246)	Liang-Gi Yao, et al.	10/762,164	01-21-04	3763	01-21-2004	014915/0980
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